

Appendix B

Fact Sheets on Federal Subsidies and Other Interventions for Energy Transformation and End Use

1. Low Income Home Energy Assistance Program

Description

The Low Income Home Energy Assistance Program (LIHEAP), originally established in 1981, is a block grant program under which the Federal Government gives States, the District of Columbia, U.S. territories, and Indian tribal organizations annual grants to provide home energy assistance for needy households. LIHEAP is administered through the U.S. Department of Health and Human Services, but most of the important decisions about the program's implementation are left to the grantees. LIHEAP assistance does not reduce eligibility or benefits under other aid programs.

Federal rules also require outreach activities; coordination with the U.S. Department of Energy's Weatherization Assistance Program; and annual audits. Grantees decide the mix and dollar range of benefits, choose how benefits are provided, and decide what agencies will administer the program components. In addition to funds used for heating and/or cooling assistance, however, a reasonable amount of the funds must be set aside by grantees for energy crisis intervention. Up to 15 percent of grantees' allotments (up to 25 percent with a waiver) may be used for low-cost residential weatherization or other energy-related home repair.

Payments may be made directly to eligible households or to home energy suppliers. Assistance may be provided in the form of cash, vouchers, or payments to third parties, such as utility companies or fuel dealers. In practice, the majority of the funds are paid directly to energy providers.¹⁶²

Revenue Loss/Outlay

The fiscal year 1999 Omnibus Appropriations Bill, signed on October 21, 1998, provided \$1.1 billion (1999 dollars) in LIHEAP funding for fiscal year 1999, plus \$300 million appropriated in emergency funding of which \$155 million was expensed, and \$1.1 billion in advanced funding for fiscal year 2000. On October 9, 1998, the U.S. Senate and House of Representatives agreed to a Conference Report reauthorizing LIHEAP for 5 years at "such sums as may be necessary" for fiscal year 2000 and fiscal year 2001, and at \$2 billion (nominal dollars) annually for fiscal years 2002 through 2004.

Rationale

When LIHEAP was first implemented, energy prices were rising rapidly. The program sought to help lower income families maintain their standard of living. Now, nearly one-half of all recipient households contain elderly or handicapped persons. The program subsidizes both heating and cooling energy use for lower income households.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

No. 2 fuel oil, natural gas, coal, and electricity end use.

Impact

LIHEAP helps to ameliorate the impacts of high energy costs on lower income households. Excluding weatherization grants, the program functions as a subsidy to energy consumption.

¹⁶²U.S. Department of Health and Human Services, web site www.acf.dhhs.gov/programs/opa/facts/heapfs.htm.

2. Building Technology Assistance Program

Description

The U.S. Department of Energy (DOE) provides conservation assistance in a number of areas, primarily through the Building Technology Assistance Program, which complements DOE's research and development efforts and accelerates the deployment of new technologies and the adoption of advanced building practices through technical and financial assistance, outreach, and selective demonstration projects. The Building Technology Assistance Program supports two grant programs: the Weatherization Assistance Program, which provides support for the weatherization of low-income homes, and the State Energy Program, which provides grants to promote innovative State energy efficiency and renewable energy activities.

Revenue Loss/Outlay

Federal appropriations outlays for the Building Technology Assistance Program amounted to \$155 million (nominal dollars) in fiscal year 1998, \$166 million in fiscal year 1999, and \$191 million in fiscal year 2000.

Rationale

The Weatherization Assistance Program engages State and local partners to increase the efficiency of homes occupied by low-income citizens who can least afford rising energy bills. The State Energy Program provides grants to State and local governments to create a network for energy efficiency.

Major Form(s) of Energy/ Fuel Cycle Stage(s) Affected

Renewable fuels, oil, gas, and electricity end use.

Impact

The Building Technology Assistance Program subsidizes energy conservation and is designed to reduce energy consumption. Although the technologies supported often are cost-effective on their own, cost sharing with nonprofit and government agencies makes the first-cost barrier less inhibitive.

3. Exclusion of Interest Income on Energy-Related State and Local Bonds

Description

The interest on private activity bonds issued by State or local governments to finance certain energy facilities may be exempt from gross income for Federal tax purposes. There are three types of privately used facilities for which such bonds may be issued: facilities for the local furnishings of gas and electricity; district heating and cooling facilities; and certain environmental facilities at hydroelectric dam sites. Also included are bonds issued by local governments to acquire certain facilities previously owned by investor-owned utilities. The provision of local gas and electricity is limited to those investor-owned facilities that serve no more than two adjacent counties (or one city and an adjacent county). All of these tax-exempt private activity bonds can be issued only if they receive an allocation of authority to issue from a State's private activity bond volume cap. The cap for 1999 was the greater of \$50 per capita or \$150 million. Several other types of private activity bonds are also subject to these caps. The tax-free status of bonds for certain small-scale hydroelectric generating facilities, geothermal facilities, and alcohol production facilities was terminated in the 1980s.

Revenue Loss/Outlays

Estimated Revenue Loss and Outlay Equivalent, 1987-2004

(Million Nominal Dollars)

Fiscal Year	Revenue Loss			Outlay Equivalent ^a (Total)
	Individuals	Corporations	Total	
1987	0	305	305	360
1988	0	290	290	385
1989	0	315	315	380
1990	0	255	255	315
1991	0	125	125	185
1992	0	125	125	185
1993	100	65	165	235
1994	105	70	175	245
1995	105	70	175	250
1996	105	70	175	255
1997	105	70	175	255
1998	80	30	110	155
1999	80	30	110	155
2000	80	30	110	155
2001	85	30	115	165
2002	85	30	115	165
2003	85	30	115	165
2004	85	30	115	165

^aAn outlay equivalent is the amount of outlay that would be required to provide the taxpayer the same after-tax income as would be received through the tax preference.

Sources: **1987-1993**: Office of Management and Budget, *Budget of the United States Government, Fiscal Year 1993* (Washington, DC, 1992). **1994-2004**: Office of Management and Budget, *Analytical Perspectives, 2000* (Washington, DC, 1999). Also earlier editions.

Rationale

The tax exemption is intended to encourage the development of specific types of energy facilities.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Natural gas transformation, electricity generation.

Impact

The tax exemption encourages investment in debt-financed energy projects. The subsidy lowers utility financing costs and results in product prices that are lower and product consumption that is greater than they would be without the subsidy.

4. Exclusion of Utility Conservation Subsidies

Description

The Energy Policy Act of 1992 added a new provision to the tax code which allowed subsidies from utilities directed at individuals to be excluded from the gross income of the consumer. The subsidy applies to energy conservation measures funded by the utility for the benefit of consumers. Utilities engaged in demand side management activities often pay consumers to purchase more efficient heating or cooling equipment in order to reduce the consumption of natural gas and electricity.

There are two common utility-rebate programs offered to consumers. One is load-control, which involves the installation of devices that reduce energy usage during peak-demand periods.¹⁶³ The other, load management, involves the acquisition of more efficient energy appliances, which can be obtained through the utility, or through another party. These subsidies are excluded from gross income in calculating the consumer's tax liability.

Revenue Loss/Outlay

Estimated Revenue Loss and Outlay Equivalent, 1987-2004

(Million Nominal Dollars)

Fiscal Year	Revenue Loss			Outlay Equivalent ^a (Total)
	Individuals	Corporations	Total	
1987	NA	NA	NA	NA
1988	NA	NA	NA	NA
1989	NA	NA	NA	NA
1990	NA	NA	NA	NA
1991	NA	NA	NA	NA
1992	NA	NA	NA	NA
1993	50	0	50	70
1994	100	0	100	140
1995	130	0	130	175
1996	100	0	100	210
1997	70	0	70	95
1998	80	0	80	110
1999	80	0	80	110
2000	80	0	80	105
2001	75	0	75	105
2002	75	0	75	100
2003	75	0	75	105
2004	80	0	80	105

^aAn outlay equivalent is the amount of outlay that would be required to provide the taxpayer the same after-tax income as would be received through the tax preference.

NA = not available.

Sources: Office of Management and Budget, *Budget of the United States Government, Appendix 2000* (Washington, DC, 1999). Also earlier editions.

¹⁶³B.M. Bird, S.M. Platau, and A. Warren, "Excluding Utility Rebates from Gross Income," *The CPA Journal* (March 1993), p. 56.

Rationale

The rationale for the tax subsidy is to encourage consumers to take advantage of utility funds available for the upgrade of heating and cooling equipment without penalty.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Natural gas transformation, electricity end use.

Impact

The relatively small size of the subsidy as compared with the billions of dollars spent on household appliances each year results in only a minor impact on U.S. demand for electricity and natural gas.

5. Tax Credit and Deduction for Clean-Fuel, Alternative-Fuel, and Electric Vehicles

Description

The Clean Air Act Amendments of 1990 (CAAA90) and the Energy Policy Act of 1992 (EPACT) mandate that vehicle fleets owned by fuel providers and State governments, as well as certain vehicle fleets operating in air quality nonattainment areas, gradually acquire and use low-emission vehicles in increasing percentages through the year 2010. CAAA90 includes measures directed at reducing the amount of pollutants emitted from vehicles. Petroleum-based gasoline and diesel fuels are acceptable under CAAA90, as long as the vehicles satisfy the prescribed emissions standards. EPACT requires the use of vehicles that operate primarily on fuels other than gasoline or diesel (called alternative-fuel vehicles or AFVs).

To encourage the use of clean-fuel vehicles and AFVs, Federal and State incentives are available, such as tax credits, deductions, and exemptions for purchases of AFVs, purchases of alternative fuels used in AFVs, and the costs of building and maintaining fueling and electric charging facilities. EPACT provides Federal incentives for the purchase or conversion of individual AFVs through Federal income tax deductions for clean-fuel vehicles¹⁶⁴ and income tax credits for electric vehicles (EVs).

The amount of the tax deduction for qualified clean-fuel vehicles (in nominal dollars) is based on the gross vehicle weight (gvw) and vehicle type as follows:

- \$2,000 for automobiles, small vans and pickup trucks, and other small vehicles (excluding off-road vehicles)
- \$5,000 for trucks or vans with gvw 10,000 to 26,000 pounds
- \$50,000 for trucks or vans with gvw more than 26,000 pounds
- \$50,000 for buses with seating capacity of more than 20 adults.

The tax deduction for clean-fuel vehicles is available for business or personal vehicles, except for EVs, which are eligible for the separate Federal tax credit described below. The deduction is not amortized and must be taken in the year the vehicle is acquired. A tax deduction of up to \$100,000 per location is available for qualified clean-fuel refueling properties and EV recharging properties, provided that the equipment is used in a trade or business.

EPACT also provides an Electric Vehicle Tax Credit for purchases of qualified EVs and hybrid electric vehicles (HEVs). The amount of the credit is 10 percent of the cost of the vehicle, up to a maximum of \$4,000. To qualify for the credit, the vehicle must be powered primarily by an electric motor drawing current from batteries or other portable sources of electric current. All dedicated, plug-in only EVs qualify for the tax credit. All series and some parallel HEVs meet these qualifications.¹⁶⁵ The tax credit for EVs is available for business or personal vehicles. The dollar amounts for the Clean Fuel Vehicle tax deduction and tax credits are phased out from 2002 through 2004.

Except for deductions for the purchase or conversion of AFVs and the Federal tax credits for EVs, most of the Federal incentives for advanced vehicle technologies are programmatic grants oriented toward large investments. The lead Federal agencies for AFV programs are the Department of Energy, the Department of Transportation, and the Environmental Protection Agency.

¹⁶⁴A vehicle for any model year in a class or category of vehicles that has been certified to meet the clean-fuel standards of CAAA90 applicable for that model year is considered a clean-fuel vehicle.

¹⁶⁵A hybrid vehicle has an on-board electrical generating system (excluding fuel cell technology). A series hybrid system involves an internal combustion engine generating electricity to directly charge the batteries that propel the vehicle; a parallel hybrid system involves both the batteries and the internal combustion engine propelling the vehicle and recharging the batteries.

The Transportation Equity Act for the 21st Century (TEA-21) was signed into law by the President on June 9, 1998. TEA-21 authorizes a wide range of programs, including Federal surface transportation programs for highways, highway safety, and mass transit, for the 6-year period 1998-2003. It includes initiatives to promote infrastructure development in support of AFVs. The Highway Trust Fund (HTF) is the source of funding for most of the programs in the Act. Federal motor fuel taxes are the major source of income for the HTF. The full authorizations for the highway and transit programs in TEA-21 total almost \$218 billion.

Revenue Loss/Outlay

Estimated Revenue Loss and Outlay Equivalent, 1998-2004

(Million Nominal Dollars)

Fiscal Year	Revenue Loss			Outlay Equivalent ^a (Total)
	Individuals	Corporations	Total	
1998	15	60	75	95
1999	15	65	80	105
2000	15	75	90	115
2001	15	80	95	130
2002	15	75	90	120
2003	15	60	75	95
2004	10	50	60	65

^aAn outlay equivalent is the amount of outlay that would be required to provide the taxpayer the same after-tax income as would be received through the tax preference.

Note: Includes tax deduction for clean-fuel vehicles and property and tax credit for AFVs. Does not include funds associated with TEA-21.

Source: Office of Management and Budget, *Analytical Perspectives, 2000* (Washington, DC, 1999).

Rationale

EPACT encourages the use of alternative fuels (fuels other than gasoline or diesel) in the transportation sector of the U.S. economy in order to decrease the Nation's dependence on foreign oil, increase energy security through the use of domestically produced alternative fuels, reduce the balance of payments deficit, and stimulate domestic employment. CAAA90 created several initiatives to reinforce one of the original goals of the Clean Air Act, to reduce pollutant emissions from mobile sources.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Energy Forms: alternative fuels (methanol, denatured ethanol, and other alcohols; and fuels other than alcohol derived from biological materials, including neat biodiesel); natural gas; propane; hydrogen; electricity (including electricity from solar energy); and any other fuel the Secretary of Energy determines, by rule, is substantially not petroleum and would yield substantial energy security benefits and substantial environmental benefits.

Fuel Cycle Stages: Energy transformation (refining and blending) and end use (light-duty and heavy-duty vehicles).

Impact

EIA's *Annual Energy Outlook 2000* projects that alternative fuels used in highway travel will achieve a 2.2-percent share of all motor fuel use for highway travel by 2010.¹⁶⁶

¹⁶⁶Energy Information Administration, *Annual Energy Outlook 2000*, DOE/EIA-0383(2000) (Washington, DC, December 1999).

6. Building Technology, State and Community Programs (BTS) Research and Development

Description

The mission of the U.S. Department of Energy (DOE) building technology research and development (R&D) program, within the Office of Energy Efficiency and Renewables Energy, is to make buildings more efficient and affordable and communities more livable. The goal of the Building Research and Standards program is to accelerate the introduction of highly efficient building technologies and practices through R&D and increase the minimum energy efficiency of buildings and equipment through appliance standards, building codes, and guidelines. The building technology R&D (non-grant) programs complement other DOE grant programs that help to demonstrate and increase consumer awareness of the benefits and costs of energy-efficient technologies. DOE has supported the development and market introduction of such technologies as electronic ballasts for fluorescent lights, the condensing gas furnace, and improved refrigerant compressors.

Revenue Loss/Outlay

Appropriations for the BTS program appropriations were \$77.6 million in fiscal year 1998 and \$96.2 million in fiscal year 1999. The appropriations included \$14.4 million in fiscal year 1998 and \$15.3 million in fiscal year 1999 for regulatory expenditures that are not considered subsidies in this report. Therefore, the adjusted funding level is \$63.2 million in 1998 and \$81.0 million in 1999. (All figures are in nominal dollars.)¹⁶⁷

Rationale

Residential and commercial buildings accounted for more than one-third of U.S. energy use and 35 percent of U.S. carbon emissions in 1997.¹⁶⁸ The ratio of private investment in buildings R&D relative to expenditures is substantially lower than that for other industries, potentially slowing the rate of technological improvement in that sector.¹⁶⁹

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Oil, natural gas, and electricity end use.

Impact

The BTS 1998 Strategic Plan¹⁷⁰ established a goal of displacing 2 quadrillion British thermal units (Btu) of primary energy use by 2010 and to reduce carbon emissions in 2010 by 36 million metric tons relative to 1996 emissions.

¹⁶⁷U.S. Department of Energy, *U.S. Department of Energy Fiscal Year 2000 Congressional Budget Request*, DOE/CR-0059 (Washington, DC, May 21, 1999), Energy Efficiency and Renewable Energy, Building Technology, State and Community Sector.

¹⁶⁸Energy Information Administration, *Annual Energy Outlook 2000*, DOE/EIA-0383(2000) (Washington, DC, December 1999), Tables A2 and A19.

¹⁶⁹U.S. Department of Energy, *U.S. Department of Energy Fiscal Year 2000 Congressional Budget Request*, DOE/CR-0059 (Washington, DC, May 21, 1999), Energy Efficiency and Renewable Energy, Building Technology, State and Community Sector.

¹⁷⁰U.S. Department of Energy, *U.S. Department of Energy Fiscal Year 2000 Congressional Budget Request*, DOE/CR-0059 (Washington, DC, May 21, 1999), Energy Efficiency and Renewable Energy, Building Technology, State and Community Sector.

7. Federal Energy Management Program

Description

The Federal Energy Management Program (FEMP) was established in 1974 to provide direction, guidance, and assistance to Federal agencies in planning and implementing energy management programs. The mission of FEMP is to reduce the cost of Government by advancing energy and water efficiency, promoting renewables, and managing utility costs. Section 543 of the National Energy Conservation Policy Act, as amended by the Energy Policy Act of 1992 (EPACT) requires each agency to achieve: a 10-percent reduction in energy consumption in its Federal buildings by fiscal year 1995, when measured against a fiscal year 1985 baseline on a Btu-per-gross-square-foot basis; and a 20-percent reduction in Btu per gross square foot by fiscal year 2000. Furthermore, agencies were required to achieve a 30-percent reduction by fiscal year 2005 per Executive Order 12902, issued in 1994.

Executive Order 13123, “Greening the Government Through Efficient Energy Management” supersedes Executive Order 12902. Executive Order 13123 encourages effective energy management in the Federal Government and builds on work begun under EPACT and previous Executive Orders. The goals of the order include:

- Through life-cycle cost-effective energy measures, each agency shall reduce its greenhouse gas emissions attributed to facility energy use by 30 percent by 2010, compared to such emissions levels in 1990.
- Through life-cycle cost-effective energy measures, each agency shall reduce energy consumption per gross square foot of its facilities, excluding facilities covered in other sections of this order, by 30 percent by 2005 and 35 percent by 2010 relative to 1985.
- Through life-cycle cost-effective energy measures, each agency shall reduce energy consumption per square foot, per unit of production, or per other unit as applicable by 20 percent by 2005 and 25 percent by 2010 relative to 1990.
- Each agency shall try to expand the use of renewable energy within its facilities and in its activities by implementing renewable energy projects and by purchasing electricity from renewable energy sources. In support of the Million Solar Roofs initiative, the Federal Government shall strive to install 2,000 solar energy systems at Federal facilities by the end of 2000 and 20,000 solar energy systems at Federal facilities by 2010.
- Through life-cycle cost-effective energy measures, each agency shall reduce the use of petroleum within its facilities.
- The Federal Government shall strive to reduce total energy use and associated greenhouse gas and other air emissions, as measured at the source.
- Through life-cycle cost-effective measures, agencies shall reduce water consumption and associated energy use in their facilities to reach the goals set in the Order.

Revenue Loss/Outlay

Funding for FEMP, \$23.8 million in 1999, is not included in the tables of this report—although it appears in the End Use R&D category of the DOE budget—because the impact of the program is primarily internal to the Federal Government. Funds are used for education, training, and encouragement of third-party investments.

Rationale

The Federal Government is the Nation's largest energy consumer. With more than 500,000 buildings, the Federal Government can lead the Nation in energy-efficient building design, construction, and operation. As a major energy consumer, the Federal Government can promote energy efficiency, water conservation, and the use of renewable energy products and help foster markets for emerging technologies. In fiscal year 1996, the Government spent nearly \$8 billion to provide energy for its buildings, vehicles, and process energy.¹⁷¹ In the private sector, profit is the incentive for making conservation investments. In the public sector, other incentives are needed to encourage cost-effective investments.

Major Form(s) of Energy/ Fuel Cycle Stage(s) Affected

Energy and water efficiency, renewable energy technologies, end use.

Impact

FEMP benefits the government by:

- Reducing building energy costs and saving taxpayers money. The fiscal year 1997 Federal building energy bill was down by more than \$2 billion from 1985 (nominal dollars), about \$900 million of which resulted from Federal energy management.¹⁷²
- Expanding the marketplace by deploying new efficiency and renewable energy technologies. This will result in reducing pollution and generating new jobs.
- Promoting environmentally sound building design and operations.
- Setting a good example for State and local governments and the private sector.
- Establishing the United States as a leader among nations in managing its own energy costs.

¹⁷¹U.S. Department of Energy, Energy Efficiency and Renewable Energy Network, web site www.eren.doe.gov/femp/aboutfemp/fempoverview.html.

¹⁷²U.S. Department of Energy, Energy Efficiency and Renewable Energy Network, web site www.eren.doe.gov/femp/aboutfemp/fempoverview.html.

8. Industrial Sector Research and Development

Description

The mission of the U.S. Department of Energy (DOE) industrial sector research and development (R&D) program, within the Office of Energy Efficiency and Renewable Energy, is to improve the energy efficiency, environmental performance, and productivity of energy-intensive industries by rapidly developing and delivering advanced science and technology options that will lower raw material and energy use per unit of output; improve labor and capital productivity; and reduce generation of wastes and pollutants. The energy-intensive industries include forest products, steel, glass, aluminum, chemicals, metal casting, agriculture, petroleum, and mining.

Revenue Loss/Outlay

The industrial sector program appropriations were \$98.9 million in fiscal year 1998 and \$132.9 million in fiscal year 1999. The Advanced Turbine Systems (ATS) program funding, which is excluded from these totals, was \$35 million in fiscal year 1998 and \$33 million in fiscal year 1999.¹⁷³ (All figures are in nominal dollars.)

Rationale

Industry consumed more than 38 percent of all the energy used in the United States in 1997.¹⁷⁴ Energy use is concentrated in a relatively small number of industries. Focusing efforts on these industries should lead to substantial benefits in terms of productivity gains and reductions in pollution and waste generation. Funding includes the development of industry road maps that identify and prioritize the research efforts supported under this program on a cost-sharing basis with private industry and in collaboration with national laboratories.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

All fuels, end use.

Impact

DOE's Industry Sector Strategic Plan established a goal for 2010 of a 25-percent reduction from 1997 levels of energy consumption per unit of output.¹⁷⁵

¹⁷³The ATS program is discussed under the classification of an electric utility-oriented research program on page 33 and page 95 in *Federal Financial Interventions and Subsidies in Energy Market 1999: Primary Energy*, SR/OIAF/99-03 (Washington, DC, September 1999). Commercialization of the ATS is projected for 2001.

¹⁷⁴U.S. Department of Energy, *U.S. Department of Energy Fiscal Year 2000 Congressional Budget Request*, DOE/CR-0059 (Washington, DC, May 21, 1999), Energy Efficiency and Renewable Energy, Industry Sector.

¹⁷⁵U.S. Department of Energy, *U.S. Department of Energy Fiscal Year 2000 Congressional Budget Request*, DOE/CR-0059 (Washington, DC, May 21, 1999), Energy Efficiency and Renewable Energy, Industry Sector.

9. Transportation Sector Research and Development

Description

The U.S. Department of Energy (DOE) transportation sector research and development (R&D) program, within the Office of Energy Efficiency and Renewable Energy, funds activities directed at improved vehicle technology, fuels utilization, technology deployment, materials technologies, and related management and planning activities. The mission of the program is to support the development of advanced transportation vehicles and fuels that will reduce energy demand, particularly for petroleum; reduce criteria pollutant emissions; reduce greenhouse gas emissions; and enable U.S. transportation to sustain a strong competitive position in domestic and world markets. The transportation R&D program includes support to the Partnership for a New Generation of Vehicles (PNGV), which involves major U.S. vehicle manufacturers and multiple Federal agencies. The goal is to develop a mid-size family sedan with a fuel economy of up to 80 miles per gallon by 2004 without sacrificing comfort or safety. Research for the PNGV is directed at fuel cells, advanced direct-injection engines, exhaust systems, advanced batteries, and electronic power controllers.

Revenue Loss/Outlay

The transportation sector program appropriations were \$190.0 million in fiscal year 1998 and \$202.1 million in fiscal year 1999. The fiscal year 2000 request to Congress was \$252.1 million. (All figures are in nominal dollars.) Included in these totals were appropriations for the DOE Clean Cities Program in the amount of \$2.9 million in fiscal year 1998, \$7.9 million in fiscal year 1999, and a request for \$10.7 million in fiscal year 2000. (See the following fact sheet for the Clean Cities Program.) PNGV activities accounted for \$116.7 million in fiscal year 1998 and \$128.1 million in fiscal year 1999. The fiscal year 2000 budget request to Congress includes \$143.1 million for the PNGV.

Rationale

Transportation accounts for almost 67 percent of the petroleum consumed in the United States.¹⁷⁶ Highway vehicles contribute significantly to urban air quality problems and to carbon dioxide emissions. Given the projections of substantial growth in the number of vehicles and increased total consumption of fuels, it is essential to develop vehicles with higher fuel economy and to expand the use of clean, nonpetroleum fuels.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Petroleum (primarily), natural gas, renewable fuels (ethanol), and electricity end use.

Impact

The transportation sector program goal is to promote the use of advanced petroleum-based fuels, nonpetroleum fuels, and more efficient vehicles sufficiently to reduce projected highway transportation oil consumption in 2010 by 10 percent from the Energy Information Administration's baseline forecast in its *Annual Energy Outlook 1999*.¹⁷⁷

¹⁷⁶U.S. Department of Energy, *U.S. Department of Energy Fiscal Year 2000 Congressional Budget Request*, DOE/CR-0059 (Washington, DC, May 21, 1999), Energy Efficiency and Renewable Energy, Energy Conservation, Transportation Sector.

¹⁷⁷U.S. Department of Energy, *U.S. Department of Energy Fiscal Year 2000 Congressional Budget Request*, DOE/CR-0059 (Washington, DC, May 21, 1999), Energy Efficiency and Renewable Energy, Energy Conservation, Transportation Sector.

10. Clean Cities Program

Description

Sponsored by the U.S. Department of Energy (DOE), the Clean Cities Program is designed to encourage the use of alternative-fuel vehicles (AFVs) and their supporting infrastructure throughout the Nation. The Clean Cities organization is built on the premise that we can change our communities for the better through cooperation and voluntary partnerships, working to reduce our reliance on imported oil and improving air quality. Unlike traditional command-and-control programs, the Clean Cities Program involves the voluntary participation and partnership of local stakeholders, such as State and local governments and private businesses.

The Clean Cities Program is set up as a support program only. DOE funding supports the organization and management of the program, including information dissemination. Clean Cities coalitions do not directly receive funding from DOE but may receive information on a variety of funding sources. Although Clean Cities coalitions do not receive or distribute funds, they do act as magnets for Federal funding, such as Congestion Mitigation and Air Quality Improvement (CMAQ), and innovative alternative-fuel projects. Special alternative-fuel projects that support the Clean Cities Program may receive financial assistance through DOE's State Energy Program.

Revenue Loss/Outlay

The appropriations for the DOE Clean Cities Program (in nominal dollars) were \$2.9 million in fiscal year 1998, \$7.9 million in fiscal year 1999, and a request for \$10.7 million for fiscal year 2000.

Rationale

Emissions from vehicles are the single largest contributor to air pollution in many cities, affecting air quality and increasing health care costs. Expanding the use of alternative fuels through the Clean Cities Program offers solutions to many of these problems. By encouraging AFV use, the Clean Cities Program will help achieve energy security and environmental quality goals at both the national and local levels.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Energy Forms: alternative fuels (methanol, denatured ethanol, and other alcohols; and fuels other than alcohol derived from biological materials, including neat biodiesel); natural gas; propane; hydrogen; electricity (including electricity from solar energy); and any other fuel the Secretary of Energy determines, by rule, is substantially not petroleum and would yield substantial energy security benefits and substantial environmental benefits. **Fuel Cycle Stages:** Energy transformation (refining and blending) and end use (light-duty and heavy-duty vehicles).

Impact

The Clean Cities Program will have the ongoing impacts of advancing clean air objectives; facilitating AFV production and conversion; expanding local refueling infrastructure; supporting regulated fleets; creating new jobs and commercial opportunities; developing "Clean Corridors"; and increasing public awareness.

11. Corps of Engineers/Bureau of Reclamation Hydropower Projects

Description

The Department of the Interior's Bureau of Reclamation and the Army Corps of Engineers are both engaged directly and indirectly in hydroelectric power. Both agencies are charged with the construction, operation, and maintenance of Federal hydroelectric facilities. The Corps of Engineers operates nationwide, whereas the Bureau of Reclamation conducts its activities only in 17 western States.

The direct costs of maintenance and operation in producing hydroelectricity are paid by the Power Marketing Administrations (PMAs), which purchase and resell the power; however, the indirect costs of the projects are not allocated to electricity production. Typically, construction of dams has been primarily for the benefits of irrigation, municipal water supply, and flood control, and only secondarily for the production of power. Construction costs incurred for flood control, recreation, and fish and wildlife purposes are nonreimbursable and are borne by users of irrigation, municipal water supply, and power generation. Thus, the costs of construction for power generation need to be pro-rated accordingly. Moreover, when the Corps of Engineers dredges a waterway to facilitate navigation, and that waterway flows to a hydroelectric facility, silting at the dam is reduced, increasing the life of the dam and reducing maintenance costs. The costs are registered not for hydroelectric power generation but for navigation.

Revenue Loss/Outlay

The direct costs of power are reimbursed by the PMAs. The imputation of indirect costs borne by the Corps of Engineers or the Bureau of Reclamation for electricity production is difficult to estimate, in part because Federal reclamation law allows cross-subsidization among projects. Thus, users of the electricity reimburse not only the construction costs allocated to power generation but also some portion of the construction costs incurred for irrigation.

Rationale

The original rationale for Federal involvement with hydroelectric plants was that the cost of adding hydroelectric capability to dams was small in comparison with the perceived benefits of economic development.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Hydropower, electricity generation.

Impact

Essentially, most of the fixed costs of developing the hydroelectric sites have been paid by the Federal Government for other reasons. It may well be that, were it not for the other reasons, electric power would not have been available until later in the affected areas. The value of the economic development, although difficult to estimate, can be seen as resulting from the availability of relatively inexpensive hydropower.

12. Rural Utilities Service

Description

The U.S. Department of Agriculture (USDA) is the Federal Government's principal provider of loans used to assist infrastructure development in the Nation's rural areas. Through the Rural Utilities Service (RUS), the USDA finances the construction, improvement, and repair of electrical, communications, and water and waste disposal systems. RUS provides credit assistance through direct loans and through repayment guarantees on loans made by other lenders. Established by the Federal Crop Insurance Reform and the Department of Agriculture Reorganization Act of 1994, RUS administers the electricity and telecommunications programs that were operated by the former Rural Electrification Administration (REA) and the water and waste disposal programs operated by the former Rural Development Administration (RDA). The following discussion refers only to the electricity segment of the overall RUS utility loan program.

Revenue Loss/Outlay

Although operating somewhat like a commercial lender for rural utilities, RUS is not required or intended to recover all its financing or other costs. The primary function of the RUS is to provide credit assistance to aid in rural development. Interest charges to its borrowers cover only a portion of the Federal Government's cost for RUS electricity programs. RUS makes direct loans at below-market interest rates according to law. For these loans, it receives annual appropriations to cover the interest differential. It also receives an appropriation to cover its administrative expenses. The budget authority for the electric loans program in nominal dollars was \$33 million for fiscal year 1998, \$35 million for fiscal year 1999, and an estimated \$10 million for fiscal year 2000.¹⁷⁸

Recently RUS has written off loans to rural electric cooperatives under Department of Justice authority. RUS wrote off about \$982 million of debt in fiscal year 1996, a total of about \$1.05 billion (in constant 1996 dollars) over the 5-year period 1992-1996, and more than \$500 million (nominal dollars) in fiscal year 1997. The most significant writeoffs were related to generation and transmission borrowers, which require large investments.¹⁷⁹

Rationale

RUS electricity loans are made primarily to rural electric cooperatives; more than 99 percent of the borrowers with electricity loans are nonprofit cooperatives. These cooperatives are either generation and transmission (G&T) cooperatives or distribution cooperatives. A G&T cooperative is a nonprofit rural electric system whose chief function is to sell electric power on a wholesale basis to its owners, consisting of distribution cooperatives and other G&T cooperatives. A distribution cooperative sells the electricity it buys from a G&T cooperative to its owners, the retail customers.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Electricity.

¹⁷⁸U.S. General Accounting Office, *Federal Electricity Activities: The Federal Government's Net Cost and Potential for Future Losses*, GAO/AIMD-97-110 (Washington, DC, September 1997).

¹⁷⁹U.S. Department of Agriculture, "1999 Budget Summary," web site www.usda.gov/agency/obpa/Budget-Summary/1999/text.html.

Impact

Almost 1,000 electric cooperatives operating in 46 States own and operate some 45 percent of the Nation's electric distribution lines, serving more than 14 million electricity customers (meters). Electric cooperatives serve 11 percent of the Nation's electricity customers, accounting for almost 8 percent of the kilowatthours sold and 5 percent of the electricity generated by the electric utility industry.¹⁸⁰

¹⁸⁰Energy Information Administration, *Electric Sales and Revenue 1998*, DOE/EIA-0540(98) (Washington, DC, October 1999).

13. Power Marketing Administrations

Description

In the past, the Federal Government has sought to advance development in rural areas through its Power Marketing Administrations (PMAs): Bonneville (BPA), Southeastern (SEPA), Southwestern (SWPA), and Western Area (WAPA). The Alaska Power Administration was sold in 1998, more than 10 years after privatization of all the PMAs was first proposed by the Executive Branch. The sale of the Alaska Power Administration was achievable largely because of its small size (by far the smallest of the PMAs) and because it operated strictly as an electricity generator, with no transmission operations or non-energy activities, such as flood control, irrigation, or recreation. None of the other PMAs has been sold. Much of the activity of the PMAs consists of marketing power produced by Army Corps of Engineers and Bureau of Land Management hydropower projects. Subsidies to the PMAs include: (1) low-interest loans; (2) preferential repayment schedules; (3) debt forgiveness; and (4) no primary taxation, such as property or income tax.

BPA, by far the largest PMA, can be used as an example to describe Federal subsidies. As part of the New Deal, BPA was created by Congress to sell the power generated from Federal dams in the Columbia Basin. Publicly owned utilities were given preferential customer status to the power. The law called for the PMAs to be self-supporting by offsetting their cost from the fees charged for power; however, even if BPA always repaid its debt on time and covered all its other accounting (historical) costs, the rates charged for electric power still would not cover the true cost of providing the power. The shortfall arises because until 1974 BPA had access to special low-interest loans: in 1998, BPA had \$4.5 billion (1999 dollars) in appropriated debt outstanding, \$2.5 billion in long-term debt, and \$7.0 billion in non-Federal projects debt. BPA's appropriated debt and long-term debt in 1998 bore interest rates only slightly above the Treasury rate. Those artificially low borrowing costs are deemed a measure of Federal Government support. BPA's non-Federal debt carried a Standard and Poor's AA credit rating, reflecting in part the view of the financial community that BPA benefits from the tacit support of the U.S. Treasury. This, too, is deemed a measure of Federal Government support.

Revenue Loss/Outlay

The PMAs are expected to provide power at cost and are not intended to earn a profit because of legislative intent. The PMAs earn below-market values on their average wholesale electricity sales. If they charged wholesale rates equal to those of the neighboring utilities, their revenues would rise by \$1.4 billion (1999 dollars). This is a measure of Federal support to the consumers of the PMAs' wholesale electricity. In 1998, the U.S. Treasury's net financing costs for the PMAs ranged from \$104 million (1999 dollars) to \$340 million. The financing cost benefits derive from the PMA's ability to borrow money at the most favorable U.S. Treasury cost of funds and from a flexible repayment plan allowed to the PMAs but not to the Treasury. BPA's non-Federal borrowing at Standard and Poor's AA rating is also seen as a measure of Federal support. Further, BPA does not earn a rate of return on its assets equivalent to the average return realized by investor-owned utilities. If BPA were to realize such a return, its revenues for 1998 would rise by between \$190 million and \$466 million.

Rationale

The PMA subsidies were provided in part to promote economic development in areas where it was felt that private enterprise would not offer electric power, and in part because of the nature of the regional economy. The flexible repayment approach was adopted in view of the significant variability in revenues associated with hydroelectric power, a major source of power for some PMAs.

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Electricity transmission, distribution, and end use.

Impact

Although they differ from the Tennessee Valley Authority (TVA) (discussed in the subsequent fact sheets) in that they generally do not produce power, the PMAs sell low-cost public power to regional customers. Efforts are ongoing to make the PMAs pay for themselves, which would alleviate the equity problem involved when the Federal Government subsidizes particular groups of power consumers.

14. Tennessee Valley Authority

Description

The Tennessee Valley Authority (TVA), a Federally owned and chartered corporation, is the largest wholesale electric utility in the United States. It was created by the TVA Act of 1933 for the unified development of the Tennessee River Basin, which comprises parts of seven States. The TVA runs several programs:

- The Stewardship Program includes maintaining a system of dams, reservoirs, and navigational facilities and, among other things, maintaining and managing 230,000 acres of public land and 11,000 miles of shoreline. TVA operates and maintains the navigation channel from Paducah, Kentucky, to Knoxville, Tennessee; operates a system of multipurpose reservoirs to retain excessive seasonal runoff and regulate discharges at flow rates that can be accommodated by downstream channels and reservoirs (resulting in the reduction of flood crests); performs dam safety modifications and maintenance activities; operates dewatering areas associated with TVA's reservoir system; and performs environmental research services at its Muscle Shoals Reservation.
- The Water and Land Program is intended to aid conservation. TVA operates an air-quality monitoring network, monitors water quality, promotes the wise use of forest resources in the region, and prepares maps for its own needs and to help the U.S. Geological Survey.
- The Power Program provides power to an area of 80,000 square miles in the seven Tennessee Valley States. TVA owns and operates a substantial mix of hydroelectric, coal, gas turbine, and nuclear power plants.

Revenue Loss/Outlay

The TVA has a complicated financial structure, historically funded through a combination of power and nonpower revenues, borrowing, and direct Federal appropriations. In comparison with the interest rates paid by investor-owned utilities (IOUs), TVA is estimated to have benefited from Government support of \$77 million to \$248 million (1999 dollars) in 1998 because of the utility's artificially low borrowing costs. Asset support to the TVA ranges from \$228 million to \$557 million. In July 1997, TVA issued a 10-year business plan, the purpose of which was to outline its program for operating in a more competitive environment.

Although TVA is unregulated and was committed early on to hydropower, its venture into heavy borrowing at high interest rates for a massive nuclear program caused it to charge prices close to the average of nearby investor-owned utilities.¹⁸¹ According to the 2000 Federal budget, "Prior to 2000, appropriations provided for public services to maintain and operate public resources—navigable channels, flood control, recreation and non-regulatory, community-based programs that protect the water quality of the Tennessee river system The Budget proposes that beginning in 2000, these services be funded entirely by TVA's power revenues, users fees, and sources other than appropriations, except for Land Between the Lakes National Recreation Area."

In a 1999 report, the General Accounting Office identified \$8.5 billion of TVA's 1998 debt that was being treated as a deferred asset and at that time was not being recovered through the ratebase.¹⁸² TVA's total property, plant, and equipment assets were valued at \$29 billion (nominal dollars) in 1998. Deferred nuclear generating units accounted for \$6.3 billion of the total. Nuclear power accounted for 28 percent of TVA's gross generation by fuel source in 1998.

¹⁸¹Financial data from Energy Information Administration, *Financial Statistics of Selected Investor-Owned Utilities*, DOE/EIA-0437(90/1) (Washington, DC, 1992).

¹⁸²U.S. General Accounting Office, *Tennessee Valley Authority, Assessment of the 10-Year Business Plan*, GAO/AIMD-99-142 (Washington, DC, April 1999).

Rationale

According to President Franklin Roosevelt's promotion of the TVA, "[The] potential usefulness of the Tennessee River . . . transcends mere power development; it enters the wide fields of flood control, soil erosion, afforestation, elimination from production use of marginal agricultural lands, and distribution and diversification of industry."¹⁸³

Major Form(s) of Energy/Fuel Cycle Stage(s) Affected

Hydropower, coal, and nuclear electricity generation, transmission, distribution, and end use.

Impact

Because TVA is such a complicated enterprise, it is difficult to identify and assess the impacts of its operations. Its overall, long-term effect on the economy of the region is a matter of considerable controversy. Critics argue that most of the economic activity that occurred in the Tennessee Valley resulted from TVA's own construction and operations rather than a secondary economic boost to the region. Supporters argue that the Valley would have remained underdeveloped without the TVA. Compared with TVA's scale of operations, Federal outlays are relatively small. Under present financial conditions, TVA's power prices are near those of IOUs, and its power is not as inexpensive as its founders predicted. It is likely that the costs of compliance with the Clean Air Act Amendments of 1990 will not improve TVA's financial status, and that its power prices may rise further.

¹⁸³W.U. Chandler, *The Myth of TVA* (Cambridge, MA: Ballinger, 1984), p. 26.